

6/pets
JC20 Rec'd PCT/PTO 15 SEP 2005**TARGETING A HUNTING OR SPORTS WEAPON****BACKGROUND OF THE INVENTION**

5 The present invention concerns a method for targeting hunting or sports weapons, where a shooting person fires a number of shots. The invention also concerns an auxiliary device for performing the method.

10 In connection with targeting rifles, which is a suitable representative of this type of hunting or sports weapon, the purpose is primarily to achieve coincidence between the sighting point and the point of impact on a target disposed at a given distance from the place where the shot is fired.

15 Usually, the following procedure is used in connection with targeting rifles. The shooting person places himself in a suitable shooting position and fires a number of shots (3-5), after which the mean impact point in the target for the fired shots is performed. In that connection it is remarked that by targeting, ammunition of the same type and also of the same packing/lot is to be used, since this will reduce the influence on the dispersing of the fired shots from error sources coming from different powder storage/mixture and weight of bullet.

20 From DE GM 66 10 785 is known a device, enabling quickly and with small consumption of ammunition to set the sighting instruments of rifles with great accuracy to the real shooting ability of the barrels. On the shooting range is fired an accurately directed shot against a target. The inhole is marked on the target, e.g. by attaching a mark which is clearly seen at a distance. Subsequently, the rifle is clamped in the device mentioned in DE GM 66 10 785. With its sighting instrument, e.g. notch and fore sight, the rifle is set accurately on the centre of the target, and the device is clamped so that the rifle is fixed immovably in this position. Now the sighting instrument, e.g. notch and fore sight or the cross hairs of the , is set precisely on the inhole. A trial shot
30 will now show whether the desired effect, a precise shot, is achieved. This document shows no adjusting means and thereby does not enable setting the sighting point on the mean impact point. All adjustment occurs while the rifle is free, i.e. before the rifle is

clamped in the device. This implies greater uncertainty.

After calculating the mean impact point, it will be possible to determine how much the sighting means are to be corrected in lateral direction and vertical direction by means
5 of the sight adjusting means in order to make the sighting point and the impact point coincide. In that connection it may be said that normally it is aimed at that such adjusting mechanisms are having a very uniform equidistance which is defined in clicks, where a click corresponds to a given displacement of the sighting point at a given distance. The direction of the displacement of the sighting point is given by the rotational
10 direction in which the sighting adjusting mechanism is turned.

After determining or marking the mean impact point, it will thus, as already mentioned under adjustment, be possible to perform a change of the sighting means, so that these will coincide in the mean impact point.

15

In the following, it is to be understood so that, when speaking of sighting means, there may be the commonly known peep sight means or optical sight means in the form of telescopic sights, red point sight means, etc. The principles for the adjusting sight means are largely identical, but as it will appear from the subsequent, particularly the
20 optical sight means may be encumbered with certain error sources due to production mistakes, such as faulty grinding of the lenses, or defects in the seats in which the optical lenses are mounted.

25

After having performed adjustment of the sights by adjusting e.g. the sight adjusting screws of the telescope, of which there is typically found performance of horizontal displacement of the sighting means, and performance of a vertical displacement of the sighting means, according to need. After the performed adjustment it is usual that the shooting person fires additional shots (3-5), and subsequently and in the same way as described above, calculation of the means point of impact is performed, and it consid-
30 ered whether the sighting point and the mean point of impact are reasonably coinciding. If this is the case, the rifle is regarded as being targeted, but if there is too large deviation between the sighting point and the mean point of impact, further adjustment of the sights is performed as mentioned above, and this is repeated until the shooting

person is satisfied.

5 The said work with adjusting/targeting rifles with telescopic sights may be protracted and tiresome for the shooter, and if the equidistance between the clicks performed by the adjusting means for the sights is not uniform, the work with targeting (hunting) rifles provides with such telescope may be even very drawn-out and problematic for the one doing this work. This is a consequence of appearing weariness, the uncertainty of own shooting skills, consumption of expensive ammunition and taking up excessive much time on the shooting range where the targeting is performed, all very stressing
10 elements sometimes entailing that the shooter/rifle owner chooses to let the rifle target by a professional or postpones the targeting to a later occasion, which, of course, is not acceptable.

15 Unfortunately, it has also been realised that many rifle owners are so bad marksmen that it is difficult to get usable mean impact points. Thus it will be necessary that the shooting person fires a larger number of shots until the quality of the fired shots enable calculation of a mean impact point. Also, the fact that more than the normal 3-5 shots are to be fired for determining each mean impact point will be a source of error in connection with targeting the rifle as the concentration ability of the shooting person is
20 reduced.

A further source of error connected with targeting particularly hunting rifles consists in the fact that the barrel in common rifles usually are not intended for firing several series of shots, and this will cause heating of the barrel, which by itself may cause
25 change in the location of the shots, as the intrinsic spreading of the rifle is increased.

A further error factor is that some telescopic sights are technically unstable in the aforementioned clicks in connection with adjusting the sights. The reason for this may be defects in the lens seating and/or defective grinding of the glass constituting the
30 lenses. Therefore, it may occur that the click for performing horizontal displacement of the sights also causes a vertical displacement hereof, and reversely. Besides, a calculated number of clicks do not provide the expected displacement of the sights in horizontal/vertical direction. In that connection, the typical reaction will be that further

turning of the sight adjusting means (more clicks) are performed, but this can/will entail that adjusting the sights suddenly also will react on the first clicks, whereby the change of the position of the sights becomes too large in relation to what was expected.

5

The above problems may be further intensified in case of telescopic sights with variable magnification. As already mentioned, a bad lens seating or actual defective grinding of the lenses may entail that the sight moves when turning the magnification. This defect in particular is very difficult to reveal, as the shooting person most often thinks that it is himself who has fired a bad shot. This, however, may be far from being the case. In that connection it is to be mentioned that there is an example of a brand new telescope in the medium price category with variable magnification between greatest and least magnification moved the sight 17 cm over a shooting range of 100 m. This is, of course, quite unacceptable, and using such a rifle will certainly imply wounding the game which is attempted to be killed with such a rifle.

15

There are some actual targeting benches that may be used as aid for reducing the spreading of the shots. Here, typically shooting is done with the rifle clamped in/resting in the bench. Experienced marksmen and shooting instructors are, however, well acquainted with the fact that it is technically impossible to target a rifle clamped in a bench and then to assume attaining the same impact point/sighting point when the bench is not used. This is due to the fact that the rifle is moving differently when clamped in the bench than when the shooting person operates/holds it in a normal way when shooting. Therefore, use of this type of targeting benches is not suitable.

25

The correct way of performing targeting of e.g. a hunting rifle with telescopic sight is to fire the shots from the shooting position commonly used by hunting and from here fire the required number of shots for determining the previously mentioned mean impact point and subsequently perform adjusting of the sights with the purpose of achieving coincidence between the mean impact point and the sighting point. This method has the above error sources and may thus be very cumbersome to perform for the shooting person.

30

It is the purpose of the invention to indicate an auxiliary means in the form of an adjusting bench of the kind mentioned in the introduction for use in connection with adjusting/setting the sighting means on e.g. a hunting rifle with telescope.

5 This purpose is achieved by an adjusting bench with the characterising features of claim 1. Before the advantages of the said adjusting bench according to the invention are stated, it will be discussed briefly as to which actions are performed prior to using the adjusting bench.

10 After a relevant shooting person has assumed the commonly used shooting position (cf. the above), a suitable number of shots are fired with the rifle, which is loaded with the same type of ammunition, from a stand and against the same sighting point on a target disposed at the distance at which the rifle is to be targeted. After the shooting, determination and possibly marking of the mean impact point of the fired shots on the
15 target is performed, and the target is left in its position in the target area. The adjusting bench is set up in the stand area, after which the actual rifle is mounted in the adjusting bench by means of the first and the second set of adjustable fastening means. Then adjustment of the adjusting bench with the now mounted rifle is performed by means of the first and second set of adjusting means on it so that the sights of the rifle are
20 directed towards the sighting point used when firing the shots. The rifle is thus now fixed in this position and with the sights directed accurately against the sighting point on the target used when the shots were fired.

The absolutely advantageous and quite unique feature of the adjusting bench according
25 to the invention is the fact (while it is pre-supposed that adjustment of the sights of the rifle is necessary if deviation between sighting point and mean impact point has been detected), that in a hitherto unknown, advantageous way it will be possible subsequently to perform adjusting of the sight adjusting means so that sighting point and mean impact point will coincide during observation of the adjusting when the latter
30 occurs. Since the rifle is is clamped and fixed with the sights directed against the sighting point, this means that it will be possible for the shooting person to observe the effect of the individual clicks when operating the sight adjustment means, and by following (by visual supervision, e.g. through the telescopic sight) how the sight is dis-

placed by doing the individual clicks. It will thus be possible to perform targeting of a hunting rifle with a telescope where the click "equidistance" of the sight adjusting means is not uniform.

5 By the adjusting bench according to the invention, it will thus be possible to perform targeting of a hunting rifle by only firing 3-5 shots and subsequently to perform the above correction of the sights with the rifle clamped in the adjusting bench. However, this requires that the shooting person is capable of firing 3-5 shots in such a way that it will be possible to determine a mean point of impact for the fired shots. This is usually
10 pre-supposed to be possible for most shooting persons who own e.g. a hunting rifle.

The adjusting bench furthermore has the advantage that it can be used for revealing defects on telescopic sights with variable magnification, since by turning the magnification lens while the rifle is clamped in the adjusting bench, it will be possible to as-
15 certain whether the sight moves when changing the magnification. If that is the case, the telescope should be returned to the manufacturer, or the telescope should not be used.

In claims 3 - 12 are indicated different embodiments of the adjusting bench according
20 to the invention.

Other things being equal, the adjusting bench according to the invention will be a decisive and revolutionary novelty among the auxiliaries used traditionally in connection with targeting hunting rifles and other rifle types with diverse sights in the shape of
25 normal peep sights or optical sights in shape of telescopes. In particular the possibility provided in order to reveal, and also to compensate for, missing uniformity in the clicks in connection with the setting of the position of the sights in horizontal and vertical direction in connection with telescopic sights is a very decisive factor since it has never been possible to reveal this in connection with a traditionally used method of
30 targeting hunting rifles.

Furthermore, it is also crucial that the adjusting bench according to the invention can be used for revealing structural defects on telescopes with variable magnification.

DESCRIPTION OF THE DRAWING

The invention is explained more closely in the following with reference to the drawing, where:

- 5 Fig. 1 is a perspective view of an adjusting bench according to the invention, as seen obliquely from behind;
- Fig. 2 shows the same as Fig. 1 but a little closer;
- Fig. 3 is a close-up of the adjusting bench according to the invention around the adjusting means of the adjusting member;
- 10 Fig. 4 is a detail of the swivelling seat of the adjusting member on the base of the support holder of the adjusting bench;
- Fig. 5 is a perspective view seen obliquely from above of the adjusting bench with a rifle inserted therein with telescopic sight means;
- Fig. 6 is a view of a target with a sighting point and a mean point of impact differing from that, as seen through a telescopic sight; and
- 15 Fig. 7 shows the same as Fig. 6, but where the sighting means of the telescopic sight is adjusted to the marked mean impact point on the target.

In Fig. 1 is shown a perspective view of an adjusting bench 2 for use in adjusting
20 sights 80 when targeting guns, preferably rifles 2. As it further appears, a rifle 4 provided with normal sights 6 and an optical sight 8 in the form of a telescopic sight, respectively, is mounted in the adjusting bench 2. The adjusting bench includes a support holder 10 with a front end 12 defined as the end of the support holder 10 situated closest to the barrel mouth 14 of the rifle 4 placed in the adjusting bench 2. The support holder furthermore includes a rear end 16.

25

The support holder 10 is divided in two parts and includes a base 22 with clamping means 24 for fastening to a support 26 which in the shown embodiment of the adjusting bench 2 is constituted by supporting legs 44. At the upper side 42 of the base 22 is
30 seen an adjusting member 28 that includes a first set of adjustable fastening means 18 and a second set of adjustable fastening means 20 disposed down at the front end 12 and close to the rear end 16 of the support holder.

In the shown embodiment, close to the first fastening means 18 the adjusting member 28 is rotationally supported on the base 22 by a first rotary connection 30 and a second rotary connection 32, respectively, about a first axis 34 and a second axis 36 that form a mutual angle. The angle between the first axis 34 and the second axis 36 is 90° in the shown embodiment.

In the shown embodiment, the adjusting member 28 is connected opposite the first rotary connection 30 with the base 22 by a first set of adjusting means 38 for performing the fine adjustment by controlled displacement largely perpendicularly to the first axis and a second set of adjusting means 40 for performing a controlled displacement largely perpendicularly to the second axis 36 of the relevant end 16 of the adjusting member 28.

As already stated, the angle between the first axis 34 and the second axis 36 constitutes an angle of about 90°. Furthermore, the first axis 34 is mainly horizontally oriented and the second axis 36 has mainly vertical orientation. As it further appears from the embodiment of the adjusting bench 2 according to the invention shown in Fig. 1, the base 22 is supported by carrying legs 44 which are fastened to it by means of clamping means 24, cf. Fig. 2, and others. It is noted that the base 22 by using clamping means or the like can assume other shapes; these may e.g. be designed for mounting on a table or another firm, stable support including fastening means that interact with clamping means on the base 22.

The fastening means 18, 20 are constituted by interspaced, adjustable plates 46, the mutual spacing of which is adjustable by the setting means 48, which is typically constituted by a spindle with operating handle, for clamping relevant areas 50, 52, cf. Figs. 2, 3 and 4 of relevant stock parts 54 of a rifle 4 between the mutually facing sides 56, 58 of the plates 46.

As it most clearly appears from Fig. 3, the adjusting member 28 has a first set of adjusting means 38 for performing a controlled fine adjustment in the shape of a vertically oriented displacement of the rear end 16 of the adjusting member. The adjusting means are constituted by a screw threaded set screw 60 that includes an operating han-

dle 62, which set screw 60 is seated in a threaded hole 64 interacting with the set screw in the adjusting member 28. The free end 65 is, as indicated in Fig. 3, in contact with a relevant side of the base 22.

5 The adjusting member 28 furthermore includes a second set of adjusting means for a controlled horizontal displacement of the relevant end 16 of the adjusting member 28. The adjusting members are also here constituted by a threaded set screw 66 including operating handle 68. The set screw 66 is seated in a threaded hole 70 in the adjusting member 28 interacting with it, and the free end 71 of the set screw 66 is in contact
10 with a relevant side of a part 72 projecting from the base 22, cf. Fig. 3.

The free end of the set screw 66 for performing the horizontal displacement of rear end 16 of the adjusting member 28 is held in abutment with the relevant side of the part 72 projecting from the base 22 by means of a not shown spring device which is
15 connected with a base 22 and the adjusting member 28.

The use of the adjusting bench is already adequately described in the introduction of the description, but is only to be repeated briefly here.

20 From a stand, while using a normal shooting position for a relevant shooting person, a suitable number of shots are fired from the rifle 4 loaded with the same type of ammunition (and preferably from the same lot) against the same sighting point 75 on a target 76 which is disposed at the distance in which the rifle 4 is targeted, cf. Figs. 6 and 7. After firing the shots, a mean point of impact 78 on the target 76 is determined for the
25 fired shots. Then the adjusting bench 2 is set up in the stand area. The rifle is mounted fixed in the adjustable first set of fastening means 18 and the second set of adjustable fastening means 20 on the adjusting member 28, and simultaneously with the mounting there is performed a rough adjustment of the rifle in the adjusting bench so that its sights are 'roughly set' in direction of the sighting point 75 on the target. Then is per-
30 formed a fine adjustment of the adjusting bench 2 by means of the first set of adjusting means 38 for a controlled vertical displacement of the rear end 16 of the adjusting bench 2 and the second set of adjusting means 40 for controlled horizontal displacement of the rear end of the adjusting member 28, so that the sights 80 of the rifle are

finally directed towards the sighting point 75 used in firing the shots.

As it appears from Fig. 6, there is difference in the position in the target 76 of the sighting point 75 and the marked mean point of impact 78. Fig. 6 shall illustrate the image viewed by the shooting person in the situation where the rifle 4 is clamped in the adjusting bench 2 with the sights 80 trained at the sighting point 75 which was used during firing the shots resulting in the marked mean point of impact 78. The next event is to bring the setting of the sights 80 of the telescopic sight in accordance with the marked mean point of impact 78, which is done by turning the first set of sight adjusting means 82 for vertical adjustment of the sights and by turning the second set of sight adjusting means 84 for performing a horizontal adjustment of the sights. An example of correct adjusting is shown in Fig. 7 where the sights 80 in the telescopic sight 8 are brought to correspond to the marked mean point of impact 78 in the target. After performing the above acts by using the adjusting bench 2 according to the invention, the work with targeting the rifle 4 is thus finished.

The adjusting bench will thus be usable for adjusting telescopic sights 8 on rifles 4, if sight adjusting means 82, 84 in their click functions varies in relation to displacing the sights 80 by performing one or more clicks. This is caused by the rifle being fixed during adjustment of the position 80 of the sights by operating the first and second set of sight adjusting means 82, 84. It will furthermore, while effecting the adjustment of the sights, be possible for the shooting person himself to follow how much a single click at the respective sets of sight adjusting means to move the sight 80 in relation to the point of impact.

By telescopes 8 with variable magnification there may also be problems with the sights in connection with operating the magnification mechanics in the telescope being displaced vertically or horizontally or in both directions. It is of course unacceptable, and using the adjusting bench 2 can reveal this by clamping the rifle with the telescopic sight in question with the adjusting bench 2 directed towards a well-defined sighting point 75 in a target area on a target 76 and then perform operation of the magnification function of the telescope simultaneously with observing the position of the sights in relation to the point of direction.

The adjusting bench 2 can also easily be used in connection with targeting the rifle 4 which is provided with new telescopes. This is done by placing the rifle 4 in the adjusting bench 2 with the lock taken out, why there will be free sight through the barrel of the rifle. The rifle barrel is then directed towards a well-defined sighting point on the target 76, and then the lock is inserted. After that, the sights 80 of the telescope are adjusted so that these are also directed towards the sighting point 75 on the target 76. Then there will great probability that the target 76 is hit in connection with firing the first shots in connection with targeting the rifle which is otherwise performed as already described above.

10

By the invention is thus indicated an adjusting bench 2 enabling in a hitherto unseen easy and unencumbered way to perform targeting of rifles with usual sights 6 or with optical sights 8. Targeting may in most cases be done by firing between 3 and 5 shots, in contrast to the know methods where at least the double or triple number of shots are fired just for a usual targeting of a hunting rifle. Furthermore, the adjusting bench according to the invention has great advantages as regards the possibility of contributing to revealing structural defects in telescopes with variable magnification. During tests in connection with the development of the adjusting bench, the inventor has exposed that a telescopic sight in the intermediate price category mounted on a rifle 4 between the largest and least magnification had a deviation on the position of the sights of 17 on the targeting range, in that case being 100 m. This is, of course quite unacceptable for a hunting rifle, but the defect would not be revealed without using the adjusting bench according to the invention.

15

20